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Department of Agriculture

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for the year 1941

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Northern Rhodesia.

DEPARTMENT OF AGRICULTURE.

Annual Report for the Year 1941.

In accordance with instructions this report is presented in abridged form. The issue of Agricultural Statistics forms to European farmers has been suspended during the war period. Reliable figures of the quatities of the more important crops produced for sale by farmers are, however, available from other sources.

AGRICULTURE IN THE TERRITORY.

Maize.

1. The season was one of the most difficult and disastrous yet recorded. Planting was delayed and reduced in extent by alternating periods of deluge and drought. The cessation of effective rain in early February caused much of the unavoidably late planted crop to come to little or nothing.

2. In the Railway Belt production of maize *for sale* was as follows :

	120,000 bags by Europeans.
	38,000 bags by Natives.
Total	158,000 bags

Total production by European farmers was approximately 170,000 bags, with an estimated yield of between 4¼ and 4½ bags per acre.

3. Consumption increased considerably in the Railway Belt. Over the twelve months it exceeded 430,000 bags and toward the end of the year monthly consumption was 40,000 bags. The very large deficit was made good by importations from the Union of South Africa and the Belgian Congo. Consumption has now reached a figure which will not be met, even in a good year, unless more land is cropped. Deliveries from native production areas near the railway line are not likely to average more than 100,000 bags and in unfavourable seasons will be very much less. To approach self-sufficiency European deliveries would have to be nearly 400,000 bags. The largest European delivery yet recorded was 274,000 bags in 1936, when a record yield of 8 bags per acre was obtained.

Wheat.

4. For the second year in succession wheat growers enjoyed an exceptionally good season. Production for sale was approximately 18,000 bags and the price rose from 20*s.* to 24*s.* per bag. No figures are yet available for consumption, but wheat production probably amounted to about 40 per cent. of internal requirements.

Groundnuts and Beans.

5. As might have been expected from the nature of the season, the decline in groundnut and bean production was even more marked than that of maize. Practically no groundnuts and only about 2,000 bags of beans came on the market.

Tobacco : Eastern Area.

6. Tobacco production in the Eastern area was maintained at its former level in spite of the fact that a number of planters have joined the Armed Forces. Though quality was not as high as usual, prices were the highest received since the short-lived boom some fifteen years ago. The total weight sold by auction was 2,083,000 lbs. and the over-all average price was 13.163 pence per pound. Non-quota tobacco fetched an average of 11.57 pence and quota tobacco 20.754 pence.

Tobacco : Western Area.

7. In the Western area some 200,000 lbs. of tobacco were produced and sold at highly satisfactory prices. As in the Eastern area quality suffered as a result of the season.

Locusts.

8. A number of swarms of the Red Locust (*Nomadacris septemfasciata*) were present in the Northern Province in June and a few in the Central and Southern Provinces. Most swarms appear to have entered the territory from the north and east. Few swarms were recorded in the latter part of the year and little or no damage was sustained. One swarm of the African Migratory Locust (*Locusta migratoria migratorioides*) was recorded.

THE WORK OF THE DEPARTMENT.

9. No further members of the Agricultural staff were permitted to join the Armed Forces. The number of Agricultural Officers was increased toward the end of the year by the release of a former member of the staff from Active Service and by two new appointments. The number of Agricultural Supervisors was increased by two. At the end of the year the European personnel was :

Director.
Assistant Director.
Ecologist.
8 Agricultural Officers.
7 Agricultural Supervisors.
2 Clerks.

10. The main work of the department continued to be the reclamation and preservation of native areas in the Southern, Eastern and Northern Provinces. Experimental work was reduced to a minimum and the encouragement of production of native cash crops was continued only because this work had reached a stage at which it made little demand on the time of the European staff.

11. Two houses for European officers were built departmentally, one at Monze and one at Kalichero (Eastern Province).

12. Forestry continued to be administered as a sub-department. The year's work is briefly recorded in Part II of this report.

13. The report of the Ecological Survey of North Eastern Rhodesia was nearing completion at the end of the year and will probably be published in 1942. Much of the yet unpublished data was of great assistance to departmental work in the Eastern Province.

Reclamation and Preservation of Native Areas.

(*a*) *Southern Province.*

14. Increased funds, accumulated experience and a larger and better distributed European staff enabled more rapid progress to be made in the work of conserving the main native maize producing area. This is illustrated in the following table :

Year	*Acres of cultivated land protected*	*Miles of contour ridge constructed*	*Miles of grass strips demarcated*
1940	3,700	64	18
1941	12,100	146	50
Total ...	15,800	210	68

The area given as ' protected ' refers to gardens only. A vastly larger area of the countryside benefitted from the works which, in addition to the construction of contour ridges, included the demarcation of land into appropriate arable and grazing areas.

15. Ridge construction was done entirely by hand labour which is slow and some what expensive. Hand labour was chosen deliberately in preference to power units during the early stages of this work in order that construction of soil conservation works should not greatly outstrip the equally essential adoption of improved farming methods on the land protected. This initial phase is passing and the use of power units would now be highly desirable.

16. The cost of contour ridging (exclusive of European supervision) varied between 1.48 pence and 1.86 pence per yard but, owing to the introduction of an improved task system, costs were declining by the end of the year. The average length of ridge required to protect one acre was 35 yards, giving a cost of about 5*s*. per acre of ridged land. This capital expenditure is clearly worth while in view of the greatly increased potential productivity and longevity of protected land.

17. The number of ' improved farmers ' increased from 70 to 119 during the year, but the latter figure does not include many who emulated, in part, the methods adopted by those who cultivated under direct departmental supervision. Manure, which a few years ago was entirely wasted, is now in such demand that supply seems likely to present a major problem. Even on land yet unprotected, up-and-down-hill ploughing has ceased over wide areas thanks to the prompt dealing with offenders by the more enlightened Native Authorities.

18. Some ten miles of suitably sited and constructed roads were made to replace the rapidly eroding and changing tracks characteristic of the Pemba region.

19. The Plateau Tonga Native Treasury voted grants for the construction and improvement of 7 small dams and for the building of 8 Scotch carts for communal use. This work was undertaken departmentally and a courthouse and offices were also built on behalf of this Treaury. A number of improved homesteads were constructed as demonstrations.

(*b*) *Abercorn and Isoka Districts* (*Northern Province*).

20. Here the initial work of the Chitemene Control Scheme (described in preceding reports) is nearing completion. The effects are already becoming apparent, especially in areas which had been badly cut out before the introduction of the scheme. Tree growth is recovering and it is perhaps significant that there has been no real food shortage in this formerly hungry area for two years. This year, in spite of a poor season, the area actually produced a surplus of food—the first for a very long time.

21. The progress in the demarcation of village areas is shown below :

VILLAGE AREAS DEMARCATED.

Year	*Abercorn District*	*Isoka District*	*Total*
1938... ...	20	—	20
1939... ...	43	16	59
1940... ...	61	39	100
1941... ...	35	-1*	34
Total ...	159	54	213

*One new area was demarcated but two existing ones were adjusted and combined with other areas.

22. The year's work involved the cutting of 230 miles of main boundary line for which the villagers supplied 9,000 man days of voluntary labour. The campaign for better methods of tree lopping was intensified with success and the protection of regenerating woodland by early burning was more rigorously enforced.

23. Development of cultivated gardens to supplement the traditional 'burnt' gardens is proceeding apace, particularly in Abercorn district where practically every village now has a good reserve plot of cassava. Progress was also made in Isoka and Chinsali districts thanks to the interest taken by the District Commissioners.

(c) *Eastern Province.*

24. Urgently needed land for native settlement was acquired by the purchase of 5,900 square miles from the North Charterland Exploration Company. The price was settled by arbitration in October. The planning of the agricultural utilisation of this vast but essential area is under the personal control of the Assistant Director who transferred to Fort Jameson for this purpose toward the end of 1940.

25. The main programme for the year was the completion of a soil survey of Fort Jameson and parts of Petauke districts, with the dual object of preparing evidence for the North Charterland arbitration proceedings and of providing a sound basis for resettlement of many thousands of the surplus population of congested Reserves. The work involved some 2,000 miles of reconnaissance traverses and the compilation of a soil map of an area of 1,840 square miles of country. Equally important was the collection of data on land carrying capacity.

26. The data from the reconnaissance surveys clearly indicated that the available vacant land in Fort Jameson district is totally inadequate to relieve the intense population congestion within the Reserves if traditional agricultural methods are maintained. It was equally clear that measures for improving agricultural methods (except possibly improvements involving the free issue of fertilizer annually in great quantity) could not alone remedy the situation in a reasonable time, if at all, and that only the following action could appreciably affect the situation :

(*a*) Settlement of all available land in Fort Jameson district.

(*b*) Transfer of a part of the population to the eastern portion of Petauke district.

(*c*) Anti-erosion measures and improvement of agricultural practice in the existing Reserves.

27. The vacant areas are almost entirely fly-infested and it will be impossible to keep cattle in them for a considerable number of years. It was therefore considered desirable to resettle the new areas on a basis of traditional agriculture, leaving all the cattle in still seriously overcrowded Reserves where a change from traditional to mixed farming should be possible when some dilution of population has taken place.

28. In the new regions it was decided to divide the land into village areas each calculated to maintain a village in perpetuity under traditional agricultural methods and within a certain population limit. This procedure will avoid local congestion and make the maximum use of the new land. On this basis plans for village settlements were drawn up and considerable areas were demarcated by the end of the year. Wherever possible settlements were designed to act as barriers against fly enroachment and the spread of trypanosomyasis, in accordance with recommendations of the Game and Tsetse Control Department. In addition to this planning work the experimental settlement of 16 villages with a total population of over 2,000 persons was satisfactorily completed. Garden groups were laid off in alternate cultivation and protective bush strips for these villages.

29. While this preliminary work was in progress it was impossible to give much attention to the general agricultural improvement of the Reserves, and in any case it was felt desirable that a serious drive in this direction should await the completion of the resettlement programme. The existing demonstration gardens were maintained and they yielded striking proof of the effect of relatively small quantities of manure on overworked soils. Unmanured plots averaged 3 bags of maize per acre and manured plots 7.7 bags. The distribution of fruit trees was continued.

30. It was necessary to give considerable attention to the local problems of erosion control as preliminary work indicated that owing both to the system of mound cultivation (which involves heavy run-off) and to extreme shortage of land, methods adopted as standard on the railway line were unsuitable. Methods derived from Nyasaland, the United States of America and elsewhere were therefore tried on a fairly large scale. Some 28 miles of experimental anti-erosion works were constructed, protecting about 740 acres of garden. Problems of gulley control were also investigated.

Experimental work.

31. One major result is worthy of record. As a demonstration of the benefits of crop rotation, manuring and soil protection, a block at Kanchomba was contour ridged in 1937 and planted under the rotation which has since been adopted as standard in the Southern Province maize belt :—

Maize (composted) : Maize : Legumes (beans and groundnuts) : Maize.

As a control an adjoining block was worked under the (then) usual native system of continuous maize cultivation without manure and with shallow up-and-down-hill ploughing. Both blocks were on poorish, sloping, virgin land typical of the district. The results, expressed in lbs. of maize per acre, from the completion of the first cycle are :

	Improved Method.			Native Method.
Year	*Plot* 1	*Plot* 2	*Plot* 3	*Plot* 4	
	Compost				
1937/38 (Good season)	3,028	1,800	Legume	1,276	1,348
				Compost	
1938/39 (Poor season)	1,734	Legume	1,970	1,586	700
			Compost		
1939/40 (Fair season)	Legume	2,484	3,114	1,582	1,147
		Compost			
1940/41 (Bad season)	2,341	2,945	1,123	Legume	313

Average yield of maize per acre :

'Improved' plots ... ... 2,082 lbs.

'Native' plots ... ... 877 lbs.

Average output of 1 acre in 4 years :

'Improved' plots	... ...	6,245 lbs. maize plus beans and groundnuts.
'Native' plots	... ...	3,508 lbs. maize.

32. Even more significant than the greater total production of the 'improved' plots is the maintenance of their fertility. This is in striking contrast to the rapid decline of the 'native' plots.

Cash Crops.

(*a*) *Cotton.*

33. The disastrous preceding season and the demand for labour affected production in the Marambo (Luangwa Valley) area. The number of growers fell from 700 to 525 but the total output was slightly increased. 95,600 ponds of seed cotton were purchased, the average return per grower being 10*s*. 2*d*.

(*b*) *Burley Tobacco.*

34. In spite of a none too favourable season, native grown Burley tobacco did very well at Minga and there was marked improvement in quality due to better handling by the producers. These numbered 217, and a total of 48,500 pounds of leaf were bought at an average price of 3.23 pence per pound. The average return per grower was £2 18*s*. 6*d*. from a plot roughly half an acre in size. Due to lack of adequate grading and packing facilities considerable loss in weight occurred before the tobacco was sold by auction at Fort Jameson. Nevertheless the returns covered costs of purchase, transport and handling, in fact a small profit was made. The cotton and tobacco growing projects are financed by grants from the Native Development Board.

Agricultural Education.

35. The model maize 'farms' at certain schools and Mission stations in the Southern Province were continued, on the whole successfully. The better ones excited considerable interest on the part of parents and visitors and are serving a most useful purpose. 7 Mission, 4 Government and 5 Native Authority school gardens were supervised in the Northern Province and a short course for Jeanes teachers was held at Lunzuwa.

LEGISLATION.

36. The more important changes in agricultural legislation made during the year were :

The Tobacco (*Sales by Auction*) (*Amendment*) *Ordinance.*

This gave legislative authority to a scheme, already in operation in the Eastern area, for pooling the financial benefits derived from the sale of Quota tobacco.

The Plant Pests and Diseases (*Tobacco*) (*Amendment*) *Regulations.*

Control over pest-infested unmanufactured tobacco was extended to infested manufactured tobacco.

The Plant Pests and Diseases (*Tobacco*) (*No.* 2) *Regulations.*

These regulations were introduced at the request of tobacco planters. They enforce the annual cleansing of tobacco premises, prohibit the retention of old tobacco on premises except under permit and compel the uprooting of tobacco plants in the field by specified dates.

PART II.—FORESTRY.

37. It is estimated that roughly two-thirds of the total area of Northern Rhodesia is covered by tree growth. The department can deal directly only with a very small proportion of this vast forest area of over 190,000 square miles. Its activities are concentrated in the two areas of greatest economic importance—the settled portion of the Railway Belt and the Mukusi (*Baikiaea plurijuga*) forests of the south western corner of the territory. Throughout most of the rest of the country the department can only act in an advisory capacity to Administrative and other departments.

38. Mr. J. D. Martin, Assistant Conservator, who was released for service with the Forces in March, was accidentally killed near Bulawayo in November, shortly after having qualified as a Pilot in the Royal Air Force. Martin's keenness on his work was only exceeded by his desire to get at grips with the enemy. His loss is all the more regrettable because he was unable to achieve his overwhelming ambition. His report on Forestry in Barotseland, which he completed shortly before being released from the Department, will live as a record of several years of pioneering work in the Southern Division.

39. Mr. G. R. Martyn, Forester, took charge of the Southern Division on Mr. J. D. Martin's departure and a temporary Forester, Mr. S. F. Murray, was appointed to assist him.

40. Toward the end of the year, Mr. C. E. Duff, Assistant Conservator, was released from military service and seconded to the Chamber of Mines for special duty relating to the utilisation of native timbers by the mining industry. The importance of this work to our main war effort—the production of copper—arises from the fact that imported timbers which had hitherto been used almost exclisively for certain mining purposes are no longer available.

Demarcation of Forest Reserves.

41. Pending the introduction of the new Forest Ordinance no additions or alterations were made to Forest Reserves.

Industries and Exploitation.

42. (*a*) *Zambesi Saw Mills.* This company worked at full pressure throughout the year and employed an average of 106 Europeans and 3,850 natives. Operations were confined to Sesheke District. The exploitation of Malavwe Forest was completed and that of Sikubingwa Forest begun. To replace imported timber the Company felled Mukwa (*Pterocarpus angolensis*), Mutuya (*Brachystegia*

spiciformis) and Muzauli (*Copaifera coleosperma*) in addition to the main species Mukusi (*Baikiaea plurijuga*). The total volume of timber in the round extracted by the Company was 3,263,000 cubic feet. The output of sawn timber was :

Rhodesia Railway Sleepers	63,400 cu. ft.
South African Railway Sleepers	586,700 cu. ft.
Other timbers sold	520,000 cu. ft.
Total	1,170,100 cu. ft.

From the Company's operations in Sesheke District the Barotse Forest Fund received a gross revenue of £4,644.

(*b*) *Rhodesia Wood Industries Ltd.*,—This firm continued to exploit Livingstone North Forest and extracted 366,000 cubic feet of mixed timber. The firm produced some 160,000 soap box shooks, 5,000 cubic feet of staves, boards, etc. and 500 cubic feet of plywood and veneer.

(*c*) *The Mines.* The Roan Antelope Mine doubled its consumption of native timber during the year, Nchanga Mine continued cutting at a steady pace and Mufulira Mine started exploitation in the latter part of the year. All these mines drew their supplies from their own land holdings and exact figures for extraction are not available. It is estimated that well over 500,000 cubic feet of timber and poles were taken. Nkana Mine drew most of its requirements from Nkana C. Forest Reserve from which it removed 180,000 cubic feet of timber and poles and 3,500 cords of firewood. Payment for this forest produce was held over pending the completion of negotiations for an exchange of land. Broken Hill Mine cut 50,000 cubic feet of mining poles under licence and, during November and December, 8,500 cubic feet of mining timber were cut under licence for export to Kipushi Mine (Belgian Congo).

(*d*) *Other Exploitations.* Apart from the above, wood cut under licence amounted to 21,500 cords of firewood, 12,000 cubic feet of timber, and poles to a number of 10,000. Free issues, mainly for military purposes, supplied from Lusaka South Forest Reserve totalled 77,000 poles and 1,000 cords of firewood.

Imports and Exports.

43. Details of imports and exports are regarded as confidential and cannot be published during the war.

DIVISIONAL OPERATIONS : SOUTHERN DIVISION.

4. The main work in this division was the control of exploitation of the *Baikiaea* forests and the fire protection of these forests, both exploited and unexploited.

Fire Protection.

45. In Livingstone and Sesheke Districts some 485 square miles of *Baikiaea* forest were protected from fire by external and internal fireguards and constant patrolling. There were four forest fires of which all except one originated inside the fireguards. The most serious fire was caused by a canoe maker in Malanda Forest (Livingstone District). This damaged about 12 square miles of woodland. The remaining fires were comparatively trifling, only some three quarters of a square mile of poor quality forest being affected. A fire-watchers' tower erected departmentally at Machili and another erected by the Zambesi Saw Mills in Lonze Foreat, proved most useful. Early burning was enforced in Barotseland and in parts of Livingstone District.

DIVISIONAL OPERATIONS : NORTHERN DIVISION.

46. The work of the small staff, one Assistant Conservator and one Forester, was greatly increased by the rising demand for local timber.

Management and Surveys.

47. The main boundaries of Chondwe and Miengwe Forest Reserves were demarcated, and a preliminary survey of the forest types in these Reserves, which cover approximately 40 square miles, was carried out. A detailed topographical plan covering 10 square miles of Mindolo Forest Reserve and adjacent land was prepared. Urgently needed extension of such survey and stock-taking work is seriously hampered by the shortage of European staff.

Communications.

48. An extension of one mile brought the total of departmentally constructed roads in Forest Reserves to 35 miles. A higher standard of road making is now being aimed at and several sections of existing road were improved, but the present standard is far from uniform and the development of some Reserves is hampered by lack of reasonable extraction routes.

Fire Protection.

49. Early burning to prevent the occurrence of fierce late fires was carried out in all Forest Reserves and over certain areas of Crown Land which had been exploited under departmental supervision. Roughly 250 square miles were covered by these operations.

Silviculture.

50. Natural regeneration, mostly of coppice origin, is relied on for the restocking of exploited areas. Early burning and some thinning of coppice shoots are the only tending operations so far undertaken. As part of an anti-malarial project 1½ acres of Euclypts were planted on swampy land within Ndola township.

Research.

51. All silvicultural and planting experiments were maintained and the latter slightly extended. *Eucalyptus dives* and *E. radiata*, which were given a trial at the end of 1940 as possible sources of flotation oil used on the Copper Mines, both failed completely on a seasonally moist site while on a perennially moist site slightly over fifty per cent. of the plants survived their first season but made very little growth.

52. The drying and preservative tests with local timbers, which were started in the previous year in co-operation with the Roan Antelope Copper Mines Ltd., were completed during 1941. The results showed that there were no marked differences in the rate of drying or the absorption of preservative between the four species tested (*Brachystegia spiciformis*, *B. longifolia*, *Isoberlinia paniculata* and *I. tomentosa*). A minimum drying period of 3 months between felling and preservative treatment was required before satisfactory absorption of preservative solution could be obtained in mining timbers. It was observed that by the middle of the rains timber stacked in the open increased very markedly in moisture content and that pieces which had in the previous dry season been in a condition to absorb good quantities of preservative solution, lost their capacity to do so. This point raised doubts as to whether it would be possible to ensure satisfactory absorption during the rains without providing cover for the timber stacks. In order to get more precise information on this point a record of the behaviour of a series of wood blocks stored under different conditions of exposure was started at Ndola at the end of the year. The tests also indicated the need for further investigation into the absorption of solution by heartwood, and methods of protecting timber while drying against attacks of *Brostrychid* as well as *Scolytid* beetles.

LEGISLATION.

53. The long-awaited new Forest Ordinance was passed by Legislative Council in December and published as Ordinance No. 46 of 1941. It will not come into force, however, until notification is made by the Governor. This will be done during 1942, and new Regulations will be published simultaneously. The new Ordinance is much wider in its scope and in the powers it confers on Forest Officers than its predecessor, and will, it is hoped, remove many administrative difficulties.

C. J. LEWIN,
Director of Agriculture.

MAZABUKA,
29th May, 1942.